

WHAT IS CLAIMED IS:

1. A method of delivering a peptide or protein to a cell comprising:

a) fusing a first nucleic acid encoding the peptide or protein to a second nucleic acid encoding a modified human papillomavirus (HPV) L2 to create a fusion protein gene, wherein the L2 portion of the fusion protein gene is less than a full-length L2 gene, but encodes domains from the amino and the carboxyl termini;

b) expressing the fusion protein gene in a host cell to obtain fusion protein;

c) contacting the fusion protein with HPV L1 protein under conditions wherein the fusion protein and the L1 protein spontaneously combine to form a virus-like particle (VLP);

d) delivering the VLP to the cell.

2. A method according to Claim 1 wherein the HPV is selected from the group consisting of: HPV6a, HPV6b, HPV11, HPV16, HPV18, HPV31, HPV33, HPV35, HPV42, HPV43, HPV44, HPV45, HPV51, HPV52, and HPV56.

3. A method according to Claim 2 wherein the L2 gene encodes less than about 50% of wild type L2 protein.

4. A method according to Claim 2 wherein the peptide or protein to be delivered is selected from the group consisting of: HPV E1, E2, E3, E4, E5, E6, E7, HIV Tat and beta-lactamase.

5. A nucleic acid encoding a fusion peptide or protein comprising: a first segment comprising a nucleic acid encoding a portion of an HPV L2 protein which is less than a full-length sequence, and a second segment comprising a nucleic acid encoding a peptide or protein.

6. A nucleic acid according to Claim 5 wherein the first segment is from an HPV selected from the group consisting of: HPV6a, HPV6b, HPV11, HPV16, HPV18, HPV31, HPV33, HPV35, HPV42, HPV43, HPV44, HPV45, HPV51, HPV52, and HPV56.

7. A nucleic acid according to Claim 6 wherein the second segment encodes a protein selected from the group consisting of: E1, E2, E3, E4, E5, E6, E7 HIV Tat and beta-lactamase.

8. A HPV virus-like particle (VLP) comprising HPV L1 protein and a fusion protein wherein the fusion protein comprises:

a first protein which is an HPV L2 protein which is less than about 50% of wild type; and
a second protein or peptide.

9. A VLP according to Claim 8 wherein the HPV is selected from the group consisting of: HPV6a, HPV6b, HPV11, HPV16, HPV18, HPV31, HPV33, HPV35, HPV42, HPV43, HPV44, HPV45, HPV51, HPV52, and HPV56.

10. A host cell comprising the VLP of Claim 8.

11. A vaccine comprising a virus-like particle according to Claim 10.

12. A nucleic acid encoding a VLP according to Claim 9.